# AN EXAMINATION OF TEACHERS' INTEGRATION OF WEB 2.0 TECHNOLOGIES IN SECONDARY CLASSROOMS: A PHENOMENOLOGICAL STUDY

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**ABSTRACT**

Web 2.0 tools may be able to close the digital gap between teachers and students if teachers can integrate the tools and change their pedagogy. The TPACK framework has outlined the elements needed to effect change, and research on Web 2.0 tools shows its potential as a change agent, but little research has looked at how the two interrelate. Using a rigorous phenomenological research methodology, the "lived experiences" of seven teachers successfully adapting pedagogy with Web 2.0 tools were examined giving an in-depth qualitative analysis of how and why teachers integrate Web 2.0 to change pedagogy. The research validated the use of TPACK as a framework as well as the use of phenomenological research methodology in researching about educational technology.

**KEYWORDS**

Web 2.0, TPACK, phenomenological research methods, digital divide

## 1. OBJECTIVES OR PURPOSE

The main goal of the research was to examine what process teachers use to change their pedagogy to deliver effective instruction using Web 2.0 tools. In particular, what decisions were made to adapt the lessons and activities, and the reasons behind those decisions were examined. The qualitative tradition of phenomenology was used to gather data using the teachers' voices as they adapted pedagogies with Web 2.0 tools in the secondary classroom. The purpose of this research was to understand how the TPACK framework supported teachers as they learned the new Web 2.0 tools and adapted them for use.

## 2. PERSPECTIVE OR THEORETICAL FRAMEWORK

Adapting curriculum and pedagogy to incorporate the tools utilized by students on a regular basis has been a challenge for teachers (Harris, Mishra, & Koehler, 2010; Kumar & Vigil, 2011; Speak Up, 2011; Wang, Ertmer, & Newby, 2004). Web 2.0 tools, such as blogs, wikis, social networking, and bookmarking tools, with their ease of use and user friendly interface, may be just the tools that will enable teachers to adapt pedagogy (Spivy, Young, & Cottle, 2008). Extensive existing research has focused on how teachers learn the technology, but not on how and why they adapt their pedagogy for its effective use in classrooms (Brown & Crawford, 2005; Levin & Wadmany, 2008; Linckels, Kreis, Reuter, Dording, Weber, & Meinel, 2009; Scrimshaw, 2004; Unal & Unal, 2010).

Koehler, Mishra and Yahya (2006) have attempted to measure and effect change in pedagogy by developing the Technological, Pedagogical and Content Knowledge (TPACK) framework (Figure 1). The framework has been used by researchers (Archambeault, Wetzel, Foulger, & Williams, 2010; Bull & Ferster, 2008; Harris & Hofer, 2011; Ward, Lampner, & Savery, 2009; Williams, Foulger, & Wetzel, 2010) as a guideline for exploring teacher professional learning. The framework focuses researchers on the connection between teachers' technological knowledge, knowledge of teaching and how learning occurs, and the needs for their individual content areas.

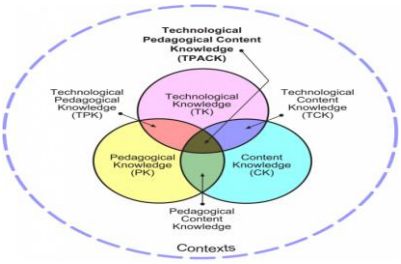


Figure 1. TPACK Framework Illustration from http://tpack.org

The TPACK framework was utilized in this study to frame the research questions:

1. What Web 2.0 tools were used in the classroom by teachers and students? How were these tools being utilized? Why were they being used?
2. What are teachers' opinions regarding the technological factors, such as access to web sites, computers, or speed of the internet, which either supported or hampered their use of Web 2.0 tools?
3. How did a teachers' knowledge of their content impact the decisions they made for choosing specific technological tools to teach that content?
4. How was pedagogy adapted for using the Web 2.0 tools, particularly studying teachers' opinions on which parts of their classroom practices were successful or unsuccessful and why?
5. What activities with the Web 2.0 tools did teachers feel were easily adapted to teach their content? How did they learn about those activities?
6. How and why did the use of the Web 2.0 tools improve teaching or learning?

## 3. METHODS, TECHNIQUES, OR MODES OF INQUIRY

Because these questions examined teachers' lived experiences, they lent themselves to a phenomenological study. Data was elicited from seven teachers who adapted their pedagogy to use the tools in their classroom. The participants participated in two interviews that were taped and transcribed. As per Cilesiz (2011), the first interview was an open-ended life history interview, followed by the second interview focusing on in-depth reflections based on the TPACK framework of how the teachers adapted their pedagogy to use the Web 2.0 tools. The synthesis of their common experiences was then sent to the participants for reviewing and input to improve internal validity. The teachers acted as co-researchers, as described by Moustakas (1994), clarifying the interpretations of the researcher from the previous interviews.

## 4. DATA SOURCES, EVIDENCE, OBJECTS OR MATERIALS

Phenomenological research requires selection of participants who have significant experience of the phenomenon, and criterion sampling of participants who fulfill certain criteria is the most suitable methodology (Cilesiz, 2011; Creswell, 2007) for participant selection. Therefore seven participants were chosen that utilized Web 2.0 technology in the classroom for at least one semester, taught at least one year in the same content area (CK) and grade level (PK), and were willing to share and articulate their experiences using the tools in the classroom.

Participants consisted of one middle school language arts teacher, two middle school computer science teachers, one high school and one middle school science teacher, one middle school music teacher and one middle school social studies teacher. Participants were given pseudonyms to protect privacy. The first two interviews were conducted with each participant with approximately one week in between the two interviews.

Data analysis included horizonalization of the data, or coding the transcripts of the 14 interviews resulting in 116 codes or meaning units. The meaning units for each participant's two interviews were merged and the textural and structural descriptions describing their experiences were written using imaginative variation. Once the data was analyzed, a composite textural description, and a composite structural description, was written then combined into a textural-structural synthesis of the experience which was sent to the participants for their feedback, and adjusted to reflect their input.

# 5. RESULTS AND/OR POINT OF VIEW

The textural and structural descriptions of each participant gave a rich description of the teachers' experiences. The essence of the experience of the phenomenon centered around interrelated themes supported by the TPACK components as indicated in the textural-structural synthesis of the study. A summary of that synthesis follows.

Technology skills (TK) were obtained by the participants either in formal training classes, or "hit or miss" on the job training. Extensive additional personal time was spent by the participants researching, exploring or "playing" with and learning both basic technology and the Web 2.0 tools. The additional time spent learning or exploring helped the participants overcome some of the technological challenges that came with adapting something new. Technical challenges included lack of access to computers, not enough outlets, sites locked by firewalls, slowness of the internet at certain times of the day, freezing computers, or software or online tools that would not work for specific tasks. A challenge specific to Web 2.0 tools involved keeping track of "all the tools, trying to keep passwords the same, keeping a record of all my passwords, and which computers I registered which site on (Renee)". Participants overcame these challenges either through the confidence gained from previous training, consulting help files or their colleagues such as the integration specialist in the school.

All the participants felt they had strong background knowledge in their content (CK) with most having completed Masters' programs. They all acknowledged that they were always learning by keeping up in their field. This content knowledge enabled them to "… know where things might fit when I teach that section" (Debby), and to understand which concepts were best taught with which tools (TCK). Sometimes tools were chosen because they made students use their background content knowledge. In addition, the tools gave the teachers a diverse set of tools to make teaching the subject more effective (PCK). Sometimes decisions on the tools were based on the ease of use of the tools for what the students needed to do with the content (TCK). Some decisions were influenced by the fact that technology itself is changing their curriculum. Some choices were based on how the tools could be used to highlight parts of the content. Examples are the use of Prezi in the science classroom to get the overall picture along with the elements, or in the social studies classroom the use of Edmodo to explore a picture, connected to an historical time period, in detail.

Pedagogical knowledge (PK) varied among the participants. One participant was a second year teacher with her pedagogy still in the process of being developed, however, she also had support from the mentor teacher, her department chair, and the integration specialist that aided her in developing and fine tuning the pedagogy. Another participant was a researcher before a teacher, so was not as aware of pedagogy and what it was. However, her content knowledge was so strong that she instinctively seemed to do what her students needed to grasp her content without being able to identify it as pedagogy. The remainder of the participants had been teaching a number of years, and had fine-tuned their pedagogies before interacting with the Web 2.0 tools. Strong pedagogical knowledge is knowing how teaching and learning can change, and if that change is beneficial (PK). An example of that is creating an Animoto character to "…bring characters to life is a different way to express ideas in literature (Debby)" which makes students think in a deeper way about what they've learned (PCK). Another teacher improved teaching by " …being able to present concepts to students by showing a lot of pictures based on nature, and then ask them what the songs will be about. They see it without you saying it. I use it so that I can talk less and the students are able to form ideas about the music before they listen to it (Janece)." Another evidence of teaching and learning changing, as expressed by several teachers, is the concept of hearing from all students in the class. As one put it, "… all the kids had to respond...so I think it was better than being in the classroom where you only call on a few students (Debby)." As one teacher summarized, with Web 2.0 tools, pedagogy can change "…from teacher centered to a facilitator as a guide on the side, to lead students in the right direction. They are more engaged in finding their own information, and when sometimes they find the wrong information, you have to step back and guide them to other websites or to what other kids are blogging, and guiding them to rethinking their thinking (Teresa)." (TPK)

# 6. SCIENTIFIC OR SCHOLARLY SIGNIFICANCE OF THE STUDY

Previous research has focused on teacher professional development in instructional technology with pre-service teachers (Brown & Crawford, 2005; Levin & Wadmany, 2008; Linckels, et al, 2009; Scrimshaw, 2004), or with in-service teachers on individual tools such as Webquests (Unal & Unal, 2010).

This research extended previous studies to include an in-depth view of in-service teachers' experience with a variety of Web 2.0 tools (Pan & Franklin, 2010) and focused on TPACK (Kohler, et al, 2006). This research points to ways to make the change process easier for teachers, administrators, and students.

In addition, utilizing a rigorous phenomenological methodology supported Cilesiz' (2011) conceptual and theoretical framework of the methodology as a primary research method for educational technology. The use of the TPACK framework during the interview process further supported that framework as an additional tool for research with in-service teachers.

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